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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,968	03/18/2004	Christie G. Enke	310.00230101	7863
7590	03/23/2005		EXAMINER SMITH, JOHNNIE L	
Attention: Victoria A. Sandberg Mueting, Raasch & Gebhardt, P. A. P. O. Box 581415 Minneapolis, MN 55458-1415			ART UNIT 2881	PAPER NUMBER

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EV

Office Action Summary	Application No. 10/804,968	Applicant(s) ENKE, CHRISTIE G.	
	Examiner Johnnie L. Smith II	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>0517</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. Claim 38 recites the limitation “provide one mass unit for other specific mass-to-charge ratio resolution by determining separation distances between the separate detectors derived from a relation of position along the flight path with respect to adjacent unit mass to charge ratio values within the range”. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-12, 14-19, and 35-37 are rejected under 35 U.S.C. 102(b) as being anticipated by US 2001/0052569 (Bateman et al). In reference to claim 1, Bateman

teaches a mass analyzer having an ion storage device; a means for applying an ion extraction voltage pulse to said storage device to accelerate the ions whereby ions leaving the storage means have mass-to-charge ratio dependent velocities; a field free region through which the ions of different mass-to-charge ratios travel different distances in a predetermined time, and detectors spaced to receive the ions of different mass-to-charge ratios which have traveled different distances in a predetermined time and provide outputs indicative of the mass-to-charge ratio of the received ions (paragraphs 0086-0089).

5. In reference to claims 2-12, Bateman teaches a mass analyzer including an ionizer (1) selected from the group comprising an electrospray ionizer, matrix-assisted Laser desorption ionizer, atmosphere pressure chemical ionizer, glow discharge ionizer, electron impact ionizer and nanospray ionizer; in which the said outputs indicative of mass-to-charge ratios of the received ions are derived from detectors positioned to receive ions of particular mass-to-charge ratios (figure 1); a deflector for deflecting ions traveling in said field free region in an orthogonal direction towards said detectors (figure 1); means for dissociating or changing the mass-to-charge ratio of said ions in said field free region into product ions so that said product ions travel at substantially the same velocity as their precursor ions and means for applying an orthogonal accelerating voltage pulse to said product

ions (paragraph 0018-0022); in which the product ions are detected by time-of-flight detectors (paragraph 0016, paragraph 0022); means for applying an orthogonal field to said product ions to deflect the ions, and said detectors are positioned to enable position dependent detection; means for applying a transverse deflection field to the ion stream after the formation of product ions so that precursor and product ions are separated transversely according to their mass-to-charge ratios; means for applying a transverse deflection field is positioned before the orthogonal acceleration region; and means for applying a transverse deflection field is positioned after the orthogonal acceleration region (paragraph 0086-0090).

6. In reference to claim 14, Bateman teaches a method of mass analyzing an ion stream which having the steps of: trapping ions in an ion storage device, applying a longitudinal extraction voltage to the storage device, allowing said ions to travel for a predetermined time in a field free region, and detecting the ions of different mass-to-charge ratio with detectors which are spaced substantially parallel to the line of travel (figure 1).

7. In reference to claim 15, Bateman teaches a method analyzing a stream of ions of different mass-to-charge ratios which have steps of: receiving and storing a predetermined number of said ions; accelerating said stored ions whereby ions of different mass-to-charge ratios attain different velocities, and determining the

mass-to-charge ratios of said ions by the distance traveled by ions of different mass-to-charge ratio in a predetermined time (paragraphs 0088).

8. In reference to claims 16-19, Bateman teaches a method of mass analyzing a stream of ions of different mass-to-charge ratios having the steps of: directing said ion stream to an ion storage means, periodically applying an extraction voltage to said storage means to extract ions from said storage means with a velocity that is dependent upon the mass-to-charge ratio of said ions; allowing said ions to travel through a field free region, and detecting said ions with ion detectors spaced to receive ions of different mass-to-charge ratio which have traveled different distances in a predetermined time (paragraph 0086- paragraph 0088); which includes the additional step of dissociating said ions in the field free region whereby to form bundles of fragment ions having the same velocity as the precursor ions and thereafter applying a orthogonal voltage pulse to said bundles to cause the fragment ions to attain a velocity which is dependent upon their mass-to-charge ratio and, detecting said fragment ions and providing information regarding their mass-to-charge ratios and that of their precursor ions (paragraph 0086-0089); and in which the fragment ions are detected by detecting their distance of travel at a predetermined time after the orthogonal pulse (paragraphs 0086).

9. In reference to claims 35-37, Bateman teaches a method of ion detection with a mass spectrometer, comprising: accelerating ions from an ion store by applying an extraction field to cause ions of smaller mass-to-charge ratio to accelerate to a greater velocity than ones of larger charge-to-mass ratio form an ion stream that follows a flight path through a field free region, laterally accelerating the ion stream within the field free region to reach adjacent ones of separate detectors in a detector array, the separate detectors being spaced from the acceleration region each by respective distances that differ from each other; and detecting ion intensity with the detectors (figure 1, paragraph 0086-0089); wherein the lateral acceleration arises by applying an electric field directed orthogonal to the flight path (figure 1); further comprising fragmenting the ion stream; sorting the ions of the fragmented ion stream according to mass to charge ratio values; and detecting the sorted ions (paragraphs 0088, figure 1).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 13 and 20-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2001/0052569 (Bateman et al) in view of US 6,797,950 (Schwartz et al). In reference to claim 20-34, Bateman teaches all limitations being claimed but failed to teach the limitation of having a plurality of separate detectors spaced from the acceleration region. It would have been obvious to one of ordinary skill to have such detector configurations, since it is taught and shown in the disclosure of Schwartz having a plurality of detector and one would be be motivated to do so for the purpose of enhancing sensitivity and for enabling enhanced ion analysis. Bateman further teaches a mass spectrometer, wherein the detectors are arranged parallel to the line of travel (figure 1); wherein the detectors present the ion intensities in reverse order of distance of the detectors from the extraction region to produce a mass spectrum (figure 1); wherein each of the

detectors is configured to accumulate ion charges over a period of time; wherein the mass analyzer is configured to operate to store and accelerate in bunches sequentially in time; wherein an ion fragmentation cell is within the field free region in the path of the accelerated ion bunch and configured to dissociate said ions to form ion fragments, wherein said lateral accelerator accelerates the ions of smaller charge-to-mass ratio to a greater velocity than the ions of larger charge-to-mass ratio and wherein said detectors are configured to measure the times-of-flight of the ions (inherent over Bateman's disclosure of a acceleration Time of Flight apparatus).

13. Bateman teaches a mass spectrometer, wherein the ion dissociation energizes precursor ions of the ion stream by collision with a neutral gas molecule to induce the dissociation (paragraph 0028); wherein the fragmentation cell applies fragmentation energy to the ion stream that avoids substantial momentum transfer to the fragment ions (paragraphs 0031-0035); wherein the extraction field generated by the extractor is derived from an extraction voltage that increases in magnitude with time (paragraph 0017); wherein the extraction field generated by the extractor is derived from an extraction pulse whose shape varies and a fragmentation section arranged to fragment the ion stream, an orthogonal time of flight section arranged to sort the ions of the fragmented ion stream according to

mass to charge ratio values said detectors arranged to detect time of arrival of the sorted ions (figure 1); further comprising a fragmenter that applies an intense, energetic beam of light, timed to coincide with appearance of ions reaching the fragmentation cell; wherein the fragmentation section includes a cell with internal reflecting surfaces; including a deflector providing a deflection field to the fragment ions so that they are separated by distance of flight and wherein the detector detects arrival of the ions and provide the mass-to-charge ratio of the ion fragments for each ion (figure 1)

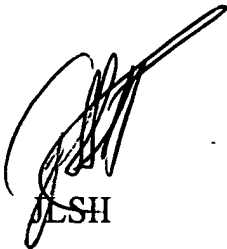
Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patents 6,586,727 (Bateman et al), 6,507,019 (Chemuchevich et al), 6,331,702 (Krutchinsky et al), and 6,285,027 (Chernushevich et al). All of the cited US patents contain art similar to that being claimed by applicant, more specifically, time of flight methods and apparatuses.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johnnie L. Smith II whose telephone number is 571-272-2481. The examiner can normally be reached on Monday-Thursday 7-4 P.M. and Alternate Fridays.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on 571-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LSH

Johnnie L Smith II
Examiner
Art Unit 2881



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